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[DOCUMENTS ATTACHED]

Specification	1 set
Drawings	1 set
Abstract	1 set

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[TITLE OF THE DOCUMENT]

Specification

[TITLE OF THE INVENTION]

Server Apparatus, Client Apparatus, Client-Server Communication System and Server Identification Method Used Therein

[PATENT CLAIMS]

[Claim 1]

A server apparatus which forms part of a client-server communication system with a plurality of client apparatus and shares a shared data file in said client-server communication system, characterized by a transmit means for formulating server specific information for use in a session with said client apparatus instead of using the specified shared data file when said client apparatus acquires said shared data file and transmitting the server specific information to said client apparatus, and means for transmitting a target shared data file to one of said client apparatus when said one client apparatus is connected to said server apparatus according to said server specific information.

[Claim 2]

A server apparatus as claimed in claim 1, further characterized by a transmit means for transmitting differential information of said target shared data file which was acquired by said client apparatus according to said client apparatus.

[Claim 3]

A server apparatus as claimed in claim 1 or 2, further characterized by means for automatically formulating server specific information as an acquired file of said client apparatus for identifying the server apparatus instead of an existing shared data file of said server apparatus.

[Claim 4]

A server apparatus as claimed in claim 1, 2 or 3, characterized in that the identifier of said shared data file is altered so that the identifier is unique and does not coincide with information stored in the cache that caches information that is used in a communication network to establish connections among the apparatus of said client-server communication system.

[Claim 5]

A client apparatus which forms part of a client-server communication system with a server apparatus and accesses said server apparatus to acquire a shared data file shared in said client-server communication system when said server apparatus maintains said shared data file, characterized by memory means for storing server specific information of said server apparatus which is transmitted from said server apparatus instead of a shared data file when said client apparatus attempts to acquire said shared data file by specifying its identity and means for acquiring a target shared data file by accessing said server apparatus according to said server specific information stored in said memory means.

[Claim 6]

A client apparatus as claimed in claim 5, characterized by a receive means for receiving differential information by accessing said server apparatus after said shared data file is acquired.

[Claim 7]

A client apparatus as claimed in claim 5 or 6, characterized in that said server specific information is acquired from said server apparatus to identify the same instead of an existing shared data file which is automatically generated and maintained in said server apparatus.

[Claim 8]

A client apparatus as claimed in claim 5, 6 or 7, characterized in that the identifier of said shared data file is altered so that said identifier is unique and does not coincide with information stored in the cache that caches information that is used to establish connections among the apparatus of said client-server communication system.

[Claim 9]

A client apparatus as claimed in claim 5, 6, 7 or 8, characterized in that said shared data file is acquired by utilizing the server specific information transmitted from another apparatus as an attached file of an electronic mail.

[Claim 10]

A client apparatus as claimed in claim 5, 6, 7, 8 or 9, characterized in that, in a multi-server environment formed by a plurality of server apparatus, any one of said server apparatus is selected and said client apparatus is connected to the selected server apparatus.

[Claim 11]

A client apparatus as claimed in claim 10, characterized in that said plurality of server apparatus form a server group and a number of apparatus are attached to the server apparatus of the group, and in that said client apparatus is arranged to acquire said shared data file according to the server specific information transmitted from a server apparatus of which the number of attached apparatus is the lowest among said server group.

[Claim 12]

A client-server communication system comprising a plurality of client apparatus which are connectable to a server apparatus and shares a shared data file maintained by said server apparatus, characterized in that said server apparatus is provided with means for formulating server specific information identifying the server apparatus for use in communication with said client apparatus instead of a shared data file specified by said client apparatus when the same attempts to acquire the shared data file and transmitting the formulated server specific information to the client apparatus, and in that each of said client apparatus is provided with a memory means for storing the server specific information transmitted from said server apparatus, and an acquisition means for acquiring a target shared data file by accessing said server apparatus according to the server specific information stored in said memory means.

[Claim 13]

A client-server communication system as claimed in claim 12

characterized in that said server apparatus is provided with a transmit means that transmits, to one of said client apparatus, differential information of said target shared data file acquired by said one client apparatus according to said server specific information and each of said client apparatus is provided with a receive means that receives said differential information by accessing said server apparatus after said shared data file is acquired.

[Claim 14]

A client-server communication system as claimed in claim 12 or 13, characterized in that each of said client apparatus is arranged to acquire server specific information instead of an existing shared data file, which is automatically generated and maintained in said server apparatus.

[Claim 15]

A client-server communication system as claimed in claim 12, 13 or 14, characterized in that the identifier of said shared data file is altered so that the identifier is unique and does not coincide with information stored in the cache that caches information that is used in a communication network to establish connections among the apparatus of said client-server communication system.

[Claim 16]

A client-server communication system as claimed in any one of claims 12 to 15, characterized in that said client apparatus is arranged to acquire said shared data file by using said server specific information transmitted from another apparatus as an attached file of an electronic mail.

[Claim 17]

A client-server communication system as claimed in any one of claims 12 to 16, characterized in that said client apparatus is arranged to select one of a plurality of server apparatus that form a multi-server environment and access the selected server apparatus.

[Claim 18]

A client-server communication system as claimed in claim 17, characterized in that said plurality of server apparatus form a server group and a number of apparatus are attached to the server apparatus of the group, and in that said client apparatus is arranged to acquire said shared data file according to the server specific information transmitted from a server apparatus of which the number of attached apparatus is the lowest among said server group.

[Claim 19]

A server identifying method for a communication system comprising a plurality of client apparatus which are connectable to a server apparatus and shares a shared data file maintained by said server apparatus, characterized in that said server apparatus formulates server specific information identifying the server apparatus for use in communication with said client apparatus instead of a shared data file specified by said client apparatus when the same attempts to acquire the shared data file and transmit the formulated server specific information to the client apparatus, and in that each of said client apparatus stores the server specific information transmitted from said server apparatus

and acquires a target shared data file by accessing said server apparatus according to the stored server specific information.

[Claim 20]

A server identifying method as claimed in claim 19, characterized in that said server apparatus transmits, to one of said client apparatus, differential information of said target shared data file acquired by said one client apparatus according to said server specific information and in that each of said client apparatus receives said differential information by accessing said server apparatus after said shared data file is acquired.

[Claim 21]

A server identifying method as claimed in claim 19 or 20, characterized in that each of said client apparatus acquires server specific information instead of an existing shared data file, which is automatically generated and maintained in said server apparatus.

[Claim 22]

A server identifying method as claimed in claim 19, 20 or 21, characterized in that the identifier of said shared data file is altered so that the identifier is unique and does not coincide with information stored in the cache that caches information that is used in a communication network to establish connections among the apparatus of said client-server communication system.

[Claim 23]

A server identifying method as claimed in any one of claims 19 to 22, characterized in that said client apparatus acquires said shared data file by using said server specific information transmitted from another apparatus as an attached file of an electronic mail.

[Claim 24]

A server identifying method as claimed in any one of claims 19 to 23, characterized in that said client apparatus selects one of a plurality of server apparatus that form a multi-server environment and accesses the selected server apparatus.

[Claim 25]

A server identifying method as claimed in claim 24, characterized in that said plurality of server apparatus form a server group and a number of apparatus are attached to the server apparatus of the group, and in that said client apparatus acquires said shared data file according to the server specific information transmitted from a server apparatus of which the number of attached apparatus is the lowest among said server group.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[TECHNOLOGICAL FIELD OF THE INVENTION]

The present invention relates to server apparatus, client apparatus, client-server communication system and server identifying method used in these apparatus, and more particularly to a connection method to be used in the client-server communication system.

[0002]

[Prior Art]

In the usual plug-in environment, a client apparatus uses an external means such as the HTML (hypertext markup language) browser to acquire a file to boot the client apparatus using the acquired file. In such environment, the acquisition of files is entrusted to the browser.

[0003]

As a result, the URL (uniform resource locator) that was used by the browser is necessary for the booted client apparatus to identify the server apparatus.

[0004]

Another method involves initially writing a special URL into a file to be downloaded and acquiring a file of other type based on this URL. A further current method is the simplest method extensively used. This acquisition method uses the server information already set in the client apparatus.

[0005]

[Problems to be Solved by the Invention]

With the prior art client-server communication system, the success or failure of the acquisition of a URL specified by the browser is determined by the function of the browser and if the server information were stored in the client apparatus, a complex process would be required to dynamically alter the server apparatus. Hence the process for identifying the dynamically altered server apparatus would become complex for the client apparatus. Some browser would become unable to identify a server apparatus.

[0006]

Additionally, in a client apparatus of the type that is booted after the file is downloaded, browser's cache control cannot perfectly be performed and if information is shared on a real-time basis the integrity of information cannot be ensured. Hence it would be difficult to guarantee that files downloaded by a browser are of most recent origin.

[0007]

Furthermore, the method of writing a URL into the file would necessitate the server information that is described in the file to be altered if the server apparatus is changed and a tedious, timing consuming work would be required. This is particularly disadvantageous for a private server environment where the server apparatus is frequently replaced with a new server apparatus since the simple transfer of shared data from the old server apparatus to the new server apparatus does not solve the problem.

[0008]

Therefore, an object of the present invention is to eliminate the above-mentioned problems with a server apparatus, a client apparatus, a client-server communication system and a server identifying method to be used in these apparatus and system in which the client apparatus is able to automatically select a server apparatus.

[0009]

Another object of the present invention is to provide a server apparatus, a client apparatus, a client-server communication system and a server identifying method to be used in these apparatus and system which guarantees the integrity of the files acquired by the client apparatus.

[0010]

A further object of the present invention is to provide a server apparatus, a client apparatus, a client-server communication system and a server identifying method to be used in these apparatus and system which enables switchover of server apparatus without altering the shared data file saved in the server apparatus.

[0011]

[MEANS FOR SOLVING THE PROBLEMS]

According to the present invention, a server apparatus is provided which forms part of a client-server communication system with a plurality of client apparatus and shares a shared data file in said client-server communication system, and comprises a transmit means for formulating server specific information for use in a session with said client apparatus instead of using the specified shared data file when said client apparatus acquires said shared data file and transmitting the server specific information to said client apparatus, and means for transmitting a target shared data file to one of said client apparatus when said one client apparatus is connected to said server apparatus according to said server specific information.

[0012]

The server apparatus of the present invention is further provided with a transmit means for transmitting differential information of said target shared data file which was acquired by said client apparatus according to said client apparatus.

[0013]

The server apparatus of the present invention is further provided with a means for automatically formulating server specific information as an acquired file of said client apparatus for identifying the server apparatus instead of an existing shared data file of said server apparatus.

[0014]

The client apparatus of the present invention forms part of a client-server communication system with a server apparatus and accesses said server apparatus to acquire a shared data file shared in said client-server communication system when said server apparatus maintains said shared data file, and is provided with a memory means for storing server specific information of said server apparatus which is transmitted from said server apparatus instead of a shared data file when said client apparatus attempts to acquire said shared data file by specifying its identity and acquisition means for acquiring a target shared data file by accessing said server apparatus according to said server specific information stored in said memory means.

[0015]

The client apparatus of the present invention is further provided with a receive means for receiving differential information by accessing said server apparatus after said shared data file is acquired.

[0016]

The client apparatus of the present invention is arranged to acquire said server specific information from said server apparatus to identify the same instead of an existing shared data file which is automatically generated and maintained in said server apparatus.

[0017]

According to the present invention, the client-server communication system comprises a plurality of client apparatus which are connectable to a server apparatus and shares a shared data file maintained by said server apparatus. In the client-server communication system, the server apparatus is provided with means for formulating server specific information identifying the server apparatus for use in communication with said client apparatus instead of a shared data file specified by said client apparatus when the same attempts to acquire the shared data file and transmitting the formulated server specific information to the client apparatus, and each of the client apparatus is provided with a memory means for storing the server specific information transmitted from said server apparatus, and an acquisition means for acquiring a target shared data file by accessing said server apparatus according to the server specific information stored in said memory means.

[0018]

In the client-server communication system of the present invention, the server apparatus is provided with a transmit means that transmits, to one of the client apparatus, differential information of the target shared data file acquired by said one client apparatus according to the server specific information and each of the client apparatus is provided with a receive means that receives the differential information by accessing the server apparatus after the shared data file is acquired.

[0019]

In the client-server communication system of the present invention, each of the client apparatus is arranged to acquire server specific information instead of an existing shared data file, which is automatically generated and maintained in the server apparatus.

[0020]

According to the present invention, a server identifying method is provided for a communication system that comprises a plurality of client apparatus which are connectable to a server apparatus and share a shared data file maintained by the server apparatus. According to the method, the server apparatus formulates server specific information identifying the server apparatus for use in communication with said client apparatus instead of a shared data file specified by said client apparatus when the same attempts to acquire the shared data file and transmit the formulated server specific

information to the client apparatus, and each of said client apparatus stores the server specific information transmitted from said server apparatus and acquires a target shared data file by accessing said server apparatus according to the stored server specific information.

[0021]

According to the server identifying method of the present invention, the server apparatus transmits, to one of said client apparatus, differential information of said target shared data file acquired by said one client apparatus according to said server specific information and in that each of said client apparatus receives said differential information by accessing said server apparatus after said shared data file is acquired.

[0022]

According to the server identifying method of the present invention, each of the client apparatus acquires server specific information instead of an existing shared data file, which is automatically generated and maintained in said server apparatus.

[0023]

Therefore, in the client-server communication system of the present invention when the external browser attempts to access to a server apparatus, an access monitoring device transmits server specific information automatically generated by the server specific information distribution apparatus and boots the client apparatus and the server specific information memory area of the client's memory device identifies the server apparatus and the shared data file acquisition apparatus and the differential information exchange apparatus are connected to the server apparatus so that the client apparatus is able to automatically select a server apparatus.

[0024]

In addition, the client-server communication system of the present invention automatically alters the information that will be transmitted from the server's processor in response to a request from the external browser to server specific information, so that even if the server specific information is cached as static information there is no adverse effect of the cache on the real time sharing of common information. The system further allows shared data file acquisition apparatus to explicitly pass through the cache to acquire shared data file that is of most recent origin. As a result, integrity can be guaranteed of the file acquired by the client apparatus.

[0025]

Furthermore, when the access monitoring apparatus of the server's processor automatically recognizes access from the external browser, the server specific information distribution apparatus is activated to dynamically formulate and transmit server specific information to the network. As a result, even if an old server apparatus that performs management of shared data file is replaced with a new server apparatus, it is not necessary to alter the shared data file maintained in the old server apparatus since the shared data file storage

section of the old server apparatus can be simply transferred to the new server apparatus.

[0026]

[MODE OF IMPLEMENTATION OF THE INVENTION]

The following is a description of an embodiment of the present invention with reference to the accompanying drawings. Fig. 1 is a block diagram of a client-server communication system according to one embodiment of the present invention. In Fig. 1, the client-server communication system includes server apparatus 1-1 and 1-2, a client apparatus 2, an external browser 3, a caching apparatus 4 and client terminals 5-1 and 5-2.

[0027]

Client terminals 5-1 and 5-2 are connected to the server apparatus 1-1 or 1-2 either directly or via the caching apparatus 4. External browser 3, connected to the client terminal 5-1, normally selects the server apparatus 1-1 or 1-2 by using the HTTP (hypertext transfer protocol) transaction and the HTML (hypertext markup language) link to receive server specific information from the selected server apparatus, and the client apparatus 2 selects one of the server apparatus 1-1 and 1-2.

[0028]

Fig. 2 is a block diagram of the server apparatus 1-1 and 1-2 and the client apparatus 2. In Fig. 2, the server apparatus 1-1 and 1-2 are shown as a single section and indicated by reference numeral 1 since they are made up of the same configuration.

[0029]

In Fig. 2, the server apparatus 1 is comprised by a server processor 11 and an intra-server common information storage section 12, and the server processor 11 is provided with an access monitoring apparatus 11a, a server specific information distribution apparatus 11b, a shared data file distribution apparatus 11c, a differential data management apparatus 11d.

[0030]

Client apparatus 2 comprises a client processor 21 and a client storage device 22. Client processor 21 is provided with a server information detector section 21a, a shared data file acquisition section 21b, and a differential data exchange section 21c. Client storage device 22 is provided with a server specification information storage section 22a and a client common information storage section 22b.

[0031]

Fig. 3 is a diagram for describing the data structure used in one embodiment of the present invention. The following is a description of the operation of the client-server communication system of the invention with reference to Figs. 1 to 3. Since the client-server communication system of the present invention is configured in a real-time information sharing mode, the client apparatus 2 and the external browser 3 are the essential elements of the system. This configuration allows the caching apparatus 4 to be located in the

[0032]

Access monitoring apparatus 11a analyzes request from the external browser 3 or client apparatus 2 and shifts control to the server specific information distribution apparatus 11b if the request is a connection request "a1" issued from the external browser 3.

[0033]

If the request is a connection request "a2" issued from the shared data file acquisition apparatus 21b, the access monitoring apparatus 11a shifts control to the shared data file distribution apparatus 11c. If the request is a connection request "a3" issued from the differential data exchange apparatus 21c, the access monitoring apparatus 11a shifts control to the differential data management apparatus 11d.

[0034]

If the connection is by the normal connection method generally used in the system, the access monitoring apparatus 11a determines that the request is one issued from external browser 3. The request from the external browser 3 cannot be controlled by the real-time information-sharing mode of the present invention. Shared data file acquisition apparatus 21b and the differential data exchange apparatus 21c append their identifier to the connection request.

[0035]

As a result, if the protocol is one generally used in a file acquisition process server specific information A is transmitted, and if the request is a special file acquisition request "a2" issued from the shared data file acquisition apparatus 21b, a shared data file B is transmitted.

[0036]

Server specific information distribution apparatus 11b transmits server specific information A, which is uniquely associated with the server apparatus 1, to the external browser 3. This server specific information A is required for the client apparatus 2 to establish connections to the shared data file distribution apparatus 11c and the differential data management apparatus 11d. The server specific information A indicates that the information sharing system depends on the server apparatus 1.

[0037]

More specifically, the server specific information A contains server address A1, server port number A2, download URL A3 and transfer status data A4. The download URL A3 and the transfer status data A4 are information uniquely associated with the server apparatus 1 and are used in the client apparatus 2 to share common data with the server apparatus 1.

[0038]

Shared data file distribution apparatus 11c transmits common information according to the request "a2" of the shared data file acquisition apparatus 21b of the client processor 21. Differential data management apparatus 11d establishes a communication route according to the connection request from the differential data exchange apparatus 21c and transmits the

apparatus 21c, or receives an alteration request from the differential data exchange apparatus 21c and repeats it to the intra-server common information storage section 12.

[0039]

Intra-server common information storage section 12 maintains all common information of the server apparatus 1. According to the request from the shared data file distribution apparatus 11c, all the shared data files of the server are transmitted as a shared data file B and according to the request from the differential data management apparatus 11d part of the common information is transmitted and alteration is made.

[0040]

External browser 3 is an apparatus that accesses the server apparatus 1 and acquires information from the server and boots the client apparatus 2 to hand over the acquired information to the client apparatus 2.

[0041]

Caching apparatus 4 is a network element for caching information to reduce the load of the server when the external browser 3 accesses the server apparatus 1 or other servers.

[0042]

Server information detector section 21a detects server specific information in the information handed over from the external browser 3 and supplies the detected server specific information to the server specific information storage section 22a. Server information detector apparatus 21a discriminates the server specific information from the shared data file. If the server processor 11 does not transmit the server specific information no setting information is sent to the server specific storage section 22a.

[0043]

If no shared data file has been acquired, the shared data file acquisition section 21b acquires a shared data file B from the server apparatus 1 by accessing the access monitoring apparatus 11a based on information supplied from the server specific information storage section 22a.

[0044]

In order to allow the access monitoring apparatus 11a to recognize the file acquisition request from the shared data file acquisition section 21b, the file acquisition request "a2" includes information for identifying the request and a unique identifier for identifying the information to be cached.

[0045]

Based on the server identifying information supplied from the server specific information storage section 22a, the differential data exchange apparatus 21c establishes a connection to the access monitoring apparatus 11a of the server apparatus 1 with the identifying information "a3" and exchanges differential information via the differential data management apparatus 11d.

[0046]

Server specific information storage section 22a stores the server specific

information detector apparatus 21a and forwards the stored information to the shared data file acquisition section 21b. If the server information detector apparatus server 21a fails to detect the server specific information, it uses the server specific information stored in the server specific information storage section 22a. This exclusively enables the client apparatus 2 that does not specify a particular server to establish a connection to a server apparatus that does not transmit the server specific information.

[0047]

Client common information storage section 22b stores the shared data file transmitted from the shared data file acquisition section 21b and the differential data exchange apparatus 21c exchanges differential information of the received shared data file.

[0048]

In this way, when the external browser 3 accesses the server processor 11, the access monitoring apparatus 11a distributes the server specific information automatically generated in the server specific information distribution apparatus server specific information distribution apparatus 11b. When the external browser 3 boots the client apparatus 2, the server specific information storage section 22a of the client storage apparatus 22 identifies a server according to the server specific information. As a result, the client apparatus 2 can automatically select the server apparatus 1 by connecting the shared data file acquisition section 21b and the differential data exchange apparatus 21c to the identified server.

[0049]

In addition, since the information to be transmitted from the server processor 11 is automatically changed to server specific information, the changed information remains static in the caching apparatus 4. This reduces the effect of the cache on the real-time information sharing nature of the system and the shared data file acquisition section 21b explicitly passes through the caching apparatus 4 to acquire most recent shared data file. Therefore, the integrity of shared data file the client apparatus 2 acquires can be guaranteed.

[0050]

In addition, the access monitoring apparatus 11a of the server processor 11 automatically recognizes the access from the external browser 3 and the server specific information distribution apparatus 11b dynamically generates and transmits server specific information. When the server that manages the shared data file is replaced with a new server, the intra-server common information storage section 12 is removed from the older server to the new server, thus eliminating the need to update the shared data file of the new server.

[0051]

Fig. 4 is a flowchart of the operation of the client-server communication system of the present invention. The following is a description of the operation of the client-server communication system with reference to Figs. 1 to 4.

When the client apparatus 2 is started and a normal process begins independently of the operation of the server apparatus 1 (Fig. 4, step S1), the external browser 3 makes a search through the network and gains access to the server apparatus 1 (step S2).

[0053]

If a shared data file which has been acquired by another browser or the same browser 3 is stored in the caching apparatus 4 (step S3), the caching apparatus 4 distributes the server specific information A (step S4).

[0054]

If a shared data file which has been acquired by another browser or the same browser 3 is not stored in the caching apparatus 4 (step S3), the server apparatus 1 transmits the server specific information A (step S5) and the external browser 3 receives it (step S6).

[0055]

In response to the server specific information A, the external browser 3 boots the client apparatus 2 to hand over the file of the acquired server specific information A (step S7). When the client apparatus 2 detects the server specific information (step S8), it saves the received information in memory (step S9).

[0056]

If the server specific information A is not detected, it is determined that the server apparatus 1 has not transmitted it and the client apparatus 2 uses the stored version of the server specific information A. If a server is identified, a shared data file B is downloaded from the server apparatus 1 (step S10) and the downloaded file is shared within the client apparatus 2 (step S11). Then, a differential data exchanging process proceeds (step S12).

[0057]

If the server apparatus 1 is one of a group of servers, the server specific information A might have been acquired by some of the servers and registered in the system (step S20). In this case, the server apparatus 1 transmits the registered server specific information A to the network at step S5 and the client apparatus 2 accesses the server apparatus which is specified by the server address A1 and the server port number A2. Load balancing is achieved in this way.

[0058]

In addition, after the client apparatus 2 is booted at step S6, the server specific information may be saved in memory at step S21 to be used later. Since the processes that follows the acquisition of the server specific information A and the shared data file B are clearly separated from each other, the target server apparatus 1 can be accessed at long intervals, provided that the server apparatus 1 is not replaced. In addition, by transmitting the server specific information A as a file to other users, login process can be entrusted to a particular user.

[0059]

Fig. 5 illustrates diagrams useful for describing the operation of the client-server communication system of the present invention. The following is a

description of the operation of the system with reference to Figs. 3 and 5.

[0060]

At step S2, the HTTP file acquisition protocol identifier (c1) is used to access the server apparatus 1. This data format is a typical HTTP file acquisition protocol data format, which is characterized by its ability to access the server without using a special CGI (common gateway interface) call.

[0061]

If no information is stored in the caching apparatus 4 in an initial file acquisition process, server specific information C is transmitted at step S5. The server specific information C contains a server C1, a server port number C2, a download URL C3, and a flag C4 which indicates that server specific information has not been transmitted. Client apparatus 2 saves the server specific information C at step S9 and accesses the server apparatus 1 by using the identifier of the HTTP file acquisition protocol (c2) at step S10.

[0062]

The HTTP file acquisition protocol c2 contains a path "RealFile_NoChash_12ABCDEF" is provided. Acquisition of a shared data file is achieved by invalidating this path at the server apparatus 1. The path described a "Real File" is neglected. "NoChash" is a unique value which is dynamically altered every time the client apparatus 2 gains access to the server apparatus so that the unique value does not hit the caching apparatus 4.

[0063]

As described in the foregoing, when an attempt is made to acquire a file in the usual manner by using a URL, server specific information C is transmitted instead of the file, and when an actual file is acquired the client apparatus 2 inserts data c2 to identify a path.

[0064]

In this way, when the external browser 3 attempts to acquire a shared data file B from the server apparatus 1, a file describing the unique information of the server apparatus is received, instead of the shared data file B which would otherwise be received, and boots the client apparatus 2 and hands over the received file to the client apparatus 2. Client apparatus 2 then gains access to the server apparatus 1 according to the server specific information. As a result, the client apparatus 2 booted by the external browser 3 can identify the server apparatus 1 which may be replaced with a new server.

[0065]

In a further aspect, since the information that the external browser 3 acquires is the server specific information A which does not affect the integrity of the shared data file B which may be changed and since the identifier of the shared data file B is unique so that it does not hit the caching apparatus 4, the presence of the caching apparatus 4 between the client apparatus 2 and the server apparatus 1 does not affect adversely on the operation of the system.

[0066]

In a still further aspect, since the server specific information A and the

specific information A is stored in different server apparatus, and automatically generated by the server apparatus 1, the moving of the shared data file B to a different server apparatus does not require resetting of the shared data file.

[0067]

[Advantages of the Invention]

As described above, in the client-server communication system of the present invention where a plurality of client apparatus are connected to a server apparatus and a data file maintained in the server apparatus is shared by the plurality of client apparatus, the server apparatus formulates server specific information of its own server apparatus which will be later used for client-server communication and transmits the server specific information to a requesting client apparatus, instead of transmitting a shared data file which is specified by the requesting client apparatus when the latter attempts to acquire the shared data file. The requesting client apparatus stores the transmitted server specific information and based on the stored server specific information the client apparatus establishes a connection to the server apparatus to acquire the target shared data file. In this manner, the client apparatus can automatically select a server apparatus.

[0068]

Further, in the client-server communication system of the present invention, the server apparatus transmits differential information of the target shared data file of the client apparatus to the client apparatus. Due to the transmission of the differential information to the client apparatus, the integrity of the shared data file is guaranteed.

[0069]

Since the requesting client apparatus receives server specific information automatically generated in the server apparatus rather than existing shared data file, the server apparatus can be replaced with a new server apparatus without changing the shared data file maintained in the old server apparatus.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Figure 1]

A block diagram of a client-server communication system according to an embodiment of this invention.

[Figure 2]

A block diagram showing details of the server apparatus and the client apparatus of Fig. 1.

[Figure 3]

Diagrams illustrating the structures of data used in the present invention.

[Figure 4]

A flowchart of the operation of the client-server communication system of the present invention.

[Figure 5]

Diagrams illustrating the detailed data structures used in the client-server communication system of the present invention.

[EXPLANATION OF REFERENCE NUMERALS]

1-1, 1-2	server apparatus
2	client apparatus
3	external browser
4	caching apparatus
5-1, 5-2	client terminal
11	server processor
11a	access monitoring apparatus
11b	server specific information distribution apparatus
11b	server specific information distribution apparatus
11c	shared file distribution apparatus
11d	differential data management apparatus
12	intra-server shared information storage section
21	client processor
21a	server information detector apparatus
21b	common file acquisition section
21c	differential data exchange apparatus
22	client storage device
22a	server specific information storage section
22b	client common information storage section
A, C	server specific information
A1, C1	server address
A2, C2	server port number
A3, C3	download URL
A4	transfer status
B	shared data file
C4	flag

[TITLE OF THE DOCUMENT] ABSTRACT

[ABSTRACT]

[OBJECT]

This invention provides a method of enabling a client apparatus, which is usually booted by a browser after the browser acquires a shared data file, to identify a server apparatus, before the client apparatus establishes a connection to the identified server apparatus to acquire the shared data file.

[MEANS FOR SOLUTION]

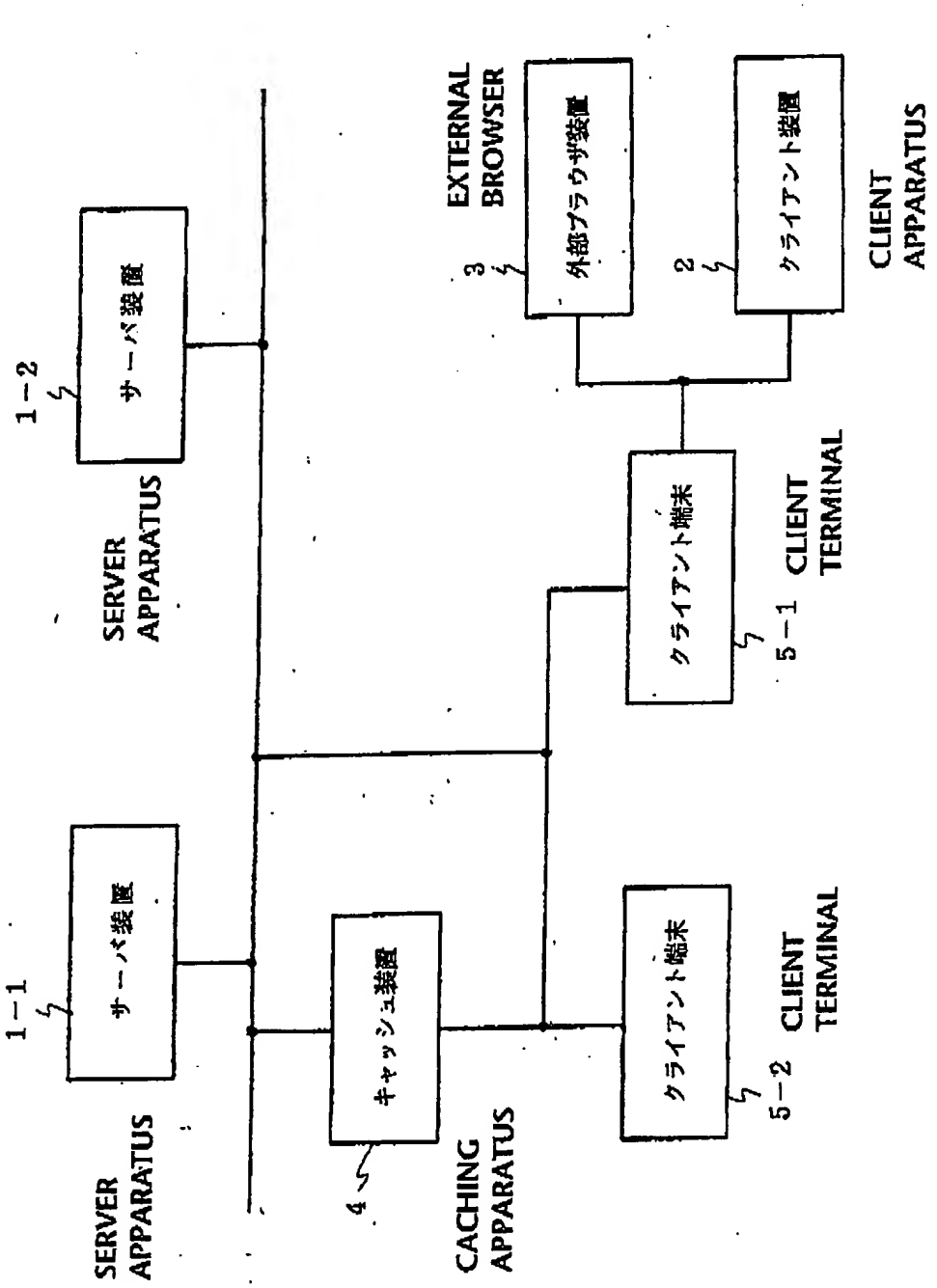
When an external browser 3 attempts to acquire a shared data file from the network of a client-server communication system, an access monitoring apparatus 11a shifts control to a server specific information distribution apparatus 11b to automatically generate and transmit server specific information that uniquely identifies a server apparatus that maintains the shared data file. A client apparatus 2, when booted by the external browser 3, receives the transmitted server specific information as a data file. When the server information detector apparatus 21a of the client apparatus detects the server specific information, the shared file acquisition apparatus 21 of the client apparatus accesses the access monitoring apparatus 11a of the server apparatus 1, based on the received server specific information. In response, the server apparatus 1 removes the file-acquisition identifier from the packet received from the client apparatus and transmits the requested shared data file to the client apparatus.

[SELECTED DRAWING] Fig. 1

【書類名】　　図面

【図１】

FIG. 1



【図２】

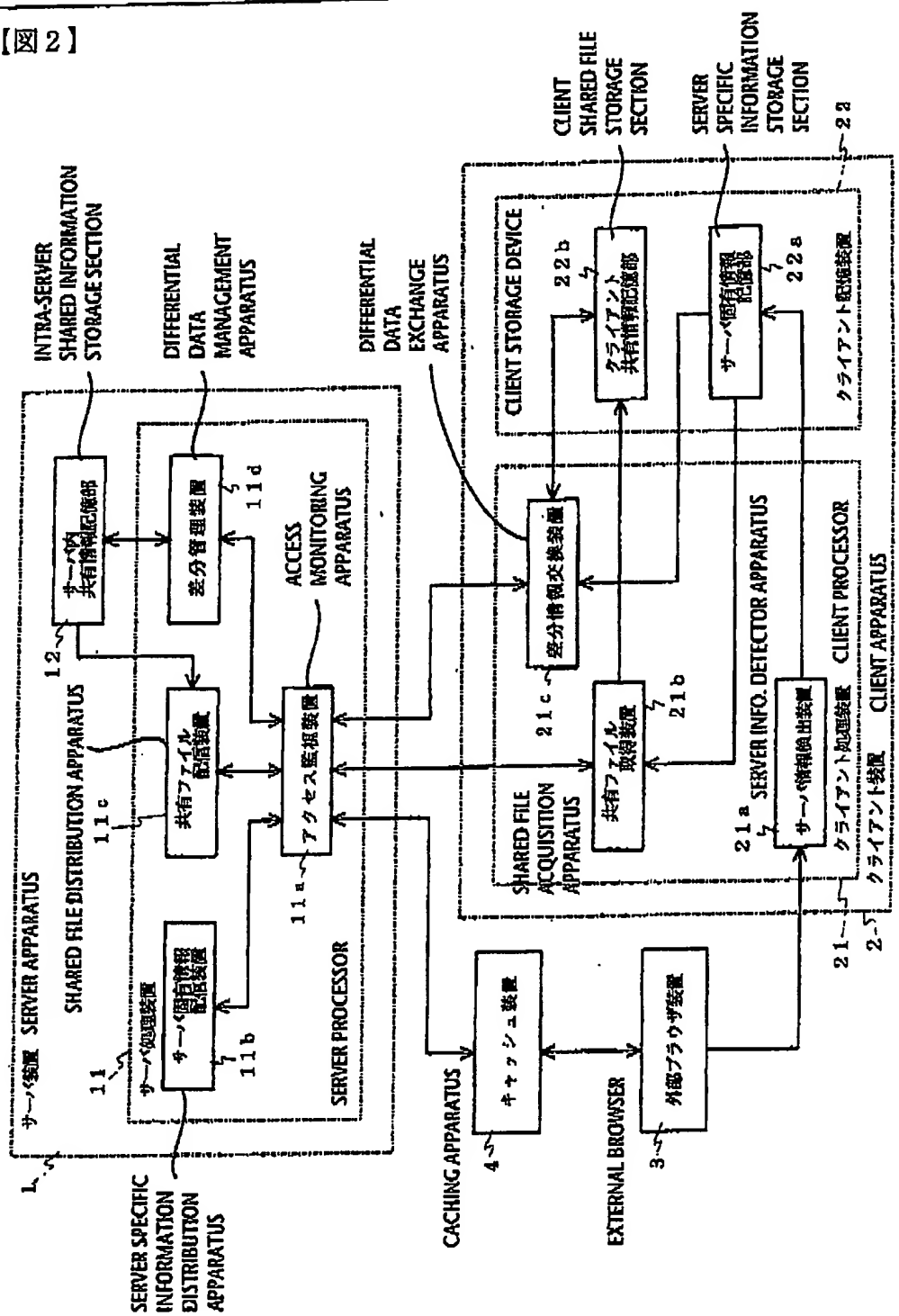
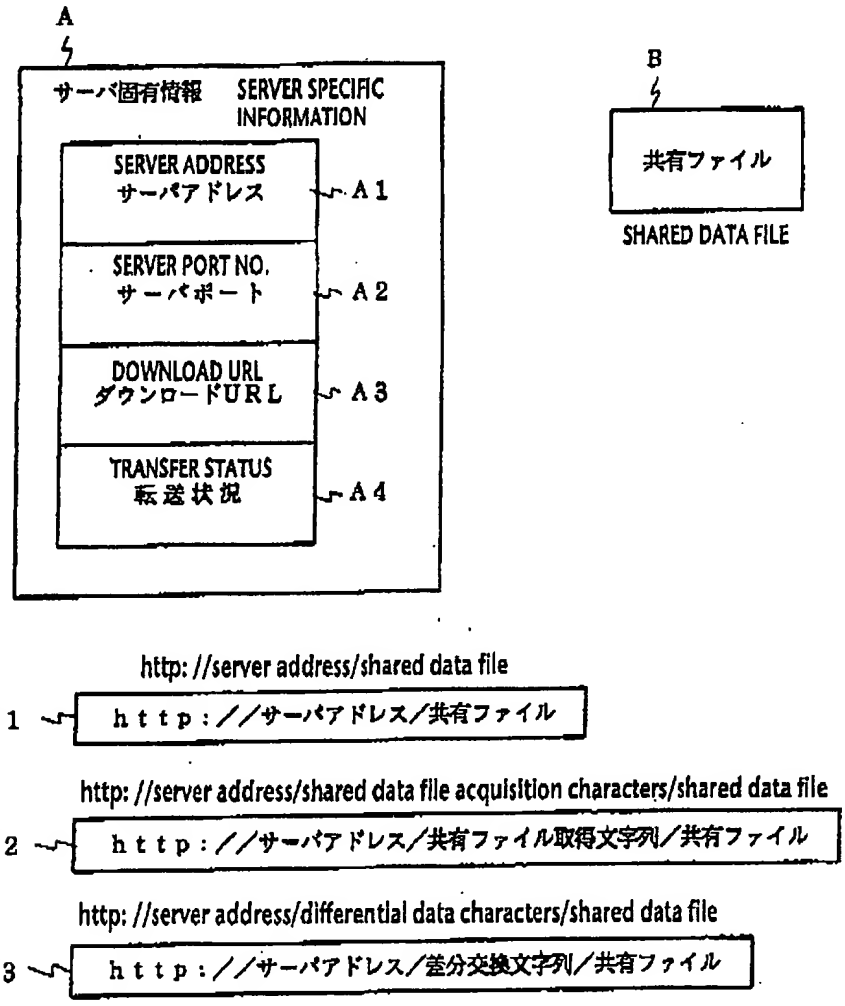
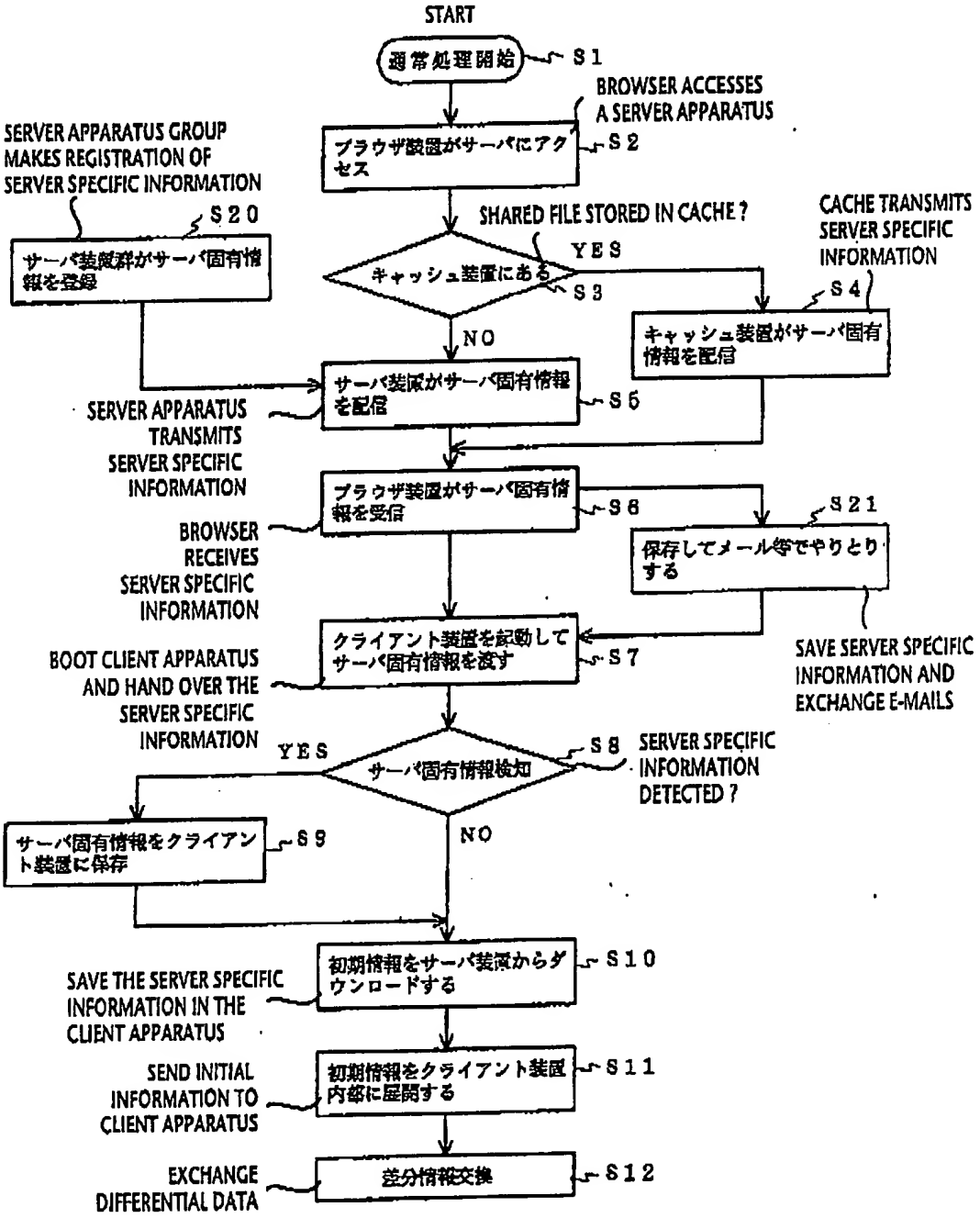

SERVER APPARATUS
SHARED FILE DISTRIBUTION APPARATUS
INTRA-SERVER SHARED INFORMATION STORAGE SECTION
DIFFERENTIAL DATA MANAGEMENT APPARATUS
ACCESS MONITORING APPARATUS
SERVER PROCESSOR
DIFFERENTIAL DATA EXCHANGE APPARATUS
CLIENT STORAGE DEVICE
CLIENT SHARED FILE STORAGE SECTION
SERVER SPECIFIC INFORMATION STORAGE SECTION
SHARED FILE ACQUISITION APPARATUS
SERVER INFO. DETECTOR APPARATUS
CLIENT PROCESSOR
CLIENT APPARATUS
SERVER SPECIFIC INFORMATION DISTRIBUTION APPARATUS
CACHING APPARATUS
EXTERNAL BROWSER

FIG. 2

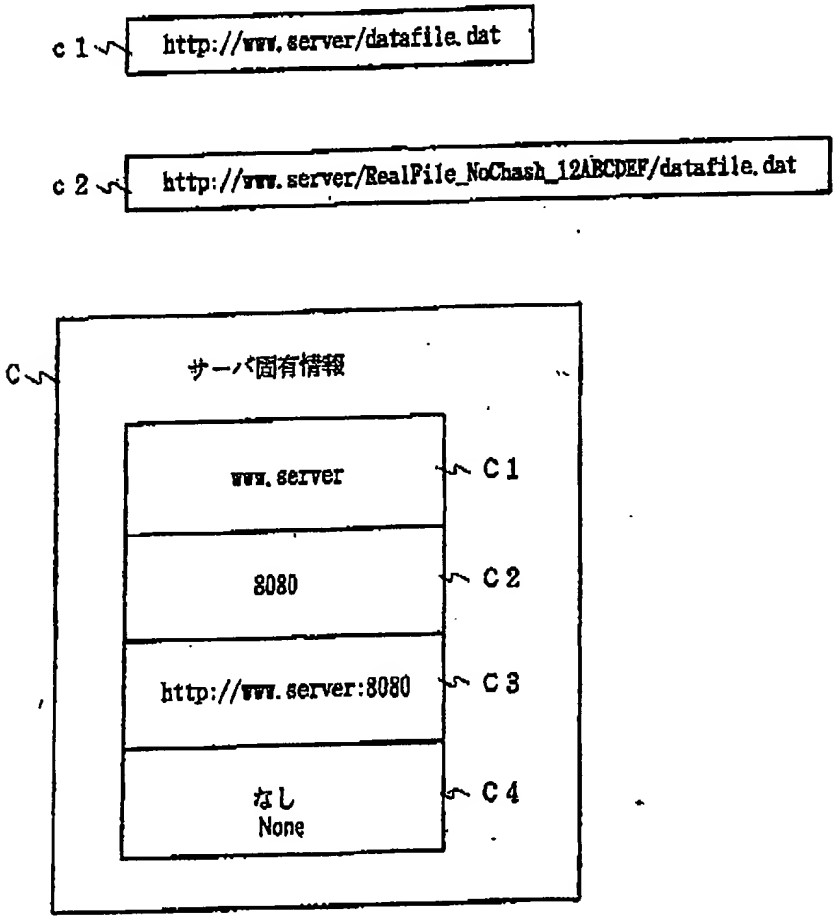
【図３】 FIG. 3


A
サーバ固有情報　SERVER SPECIFIC INFORMATION
SERVER ADDRESS
サーバアドレス
A1
SERVER PORT NO.
サーバポート
A2
DOWNLOAD URL
ダウンロードURL
A3
TRANSFER STATUS
転送状況
A4
B
共有ファイル
SHARED DATA FILE
http: //server address/shared data file
a1
ｈｔｔｐ：／／サーバアドレス／共有ファイル
http: //server address/shared data file acquisition characters/shared data file
a2
ｈｔｔｐ：／／サーバアドレス／共有ファイル取得文字列／共有ファイル
http: //server address/differential data characters/shared data file
a3
ｈｔｔｐ：／／サーバアドレス／差分交換文字列／共有ファイル

【図４】 FIG. 4


START
通常処理開始
S1
BROWSER ACCESSES A SERVER APPARATUS
ブラウザ装置がサーバにアクセス
S2
SERVER APPARATUS GROUP MAKES REGISTRATION OF SERVER SPECIFIC INFORMATION
S20
サーバ装置群がサーバ固有情報を登録
SHARED FILE STORED IN CACHE ?
YES
キャッシュ装置にある
S3
CACHE TRANSMITS SERVER SPECIFIC INFORMATION
S4
キャッシュ装置がサーバ固有情報を配信
NO
SERVER APPARATUS TRANSMITS SERVER SPECIFIC INFORMATION
サーバ装置がサーバ固有情報を配信
S5
BROWSER RECEIVES SERVER SPECIFIC INFORMATION
ブラウザ装置がサーバ固有情報を受信
S6
S21
保存してメール等でやりとりする
SAVE SERVER SPECIFIC INFORMATION AND EXCHANGE E-MAILS
BOOT CLIENT APPARATUS AND HAND OVER THE SERVER SPECIFIC INFORMATION
クライアント装置を起動してサーバ固有情報を渡す
S7
YES
サーバ固有情報検知
S8
SERVER SPECIFIC INFORMATION DETECTED ?
サーバ固有情報をクライアント装置に保存
S9
NO
SAVE THE SERVER SPECIFIC INFORMATION IN THE CLIENT APPARATUS
初期情報をサーバ装置からダウンロードする
S10
SEND INITIAL INFORMATION TO CLIENT APPARATUS
初期情報をクライアント装置内部に展開する
S11
EXCHANGE DIFFERENTIAL DATA
差分情報交換
S12

【図５】
FIG. 5


c 1
http://www.server/datafile.dat
c 2
http://www.server/RealFile_NoChash_12ABCDEF/datafile.dat
C
サーバ固有情報
www.server
C 1
8080
C 2
http://www.server:8080
C 3
なし
None
C 4